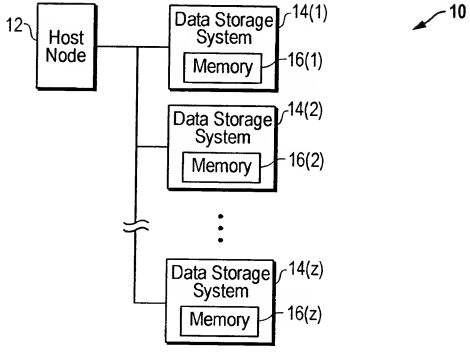
12
Host Node
Data Storage System
Memory
14(1)
16(1)
14(2)
16(2)
14(z)
16(z)
10

FIG. 1

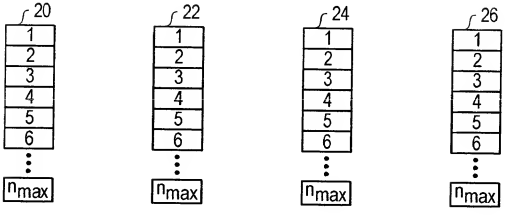
20
22
24
26
1
2
3
4
5
6
nmax

FIG. 2

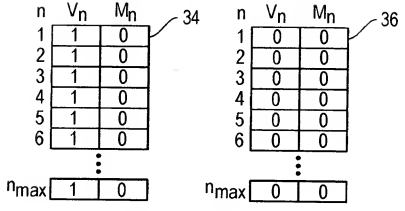

FIG. 3A

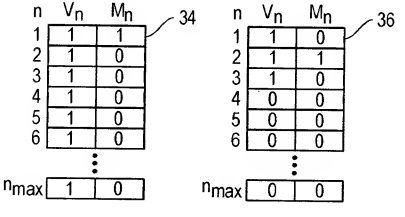

FIG. 3B

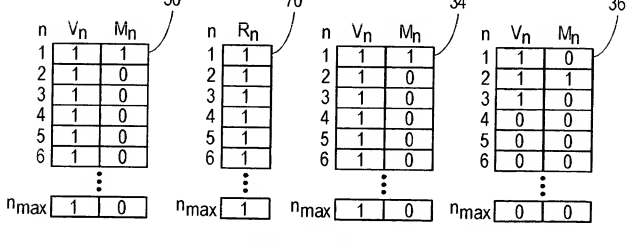

FIG. 3C

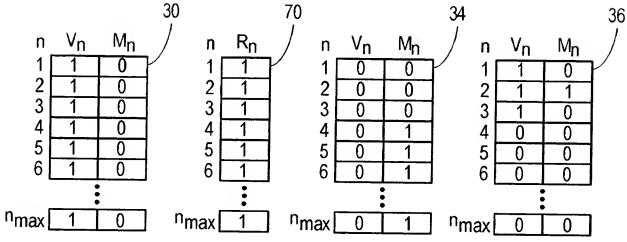

FIG. 3D

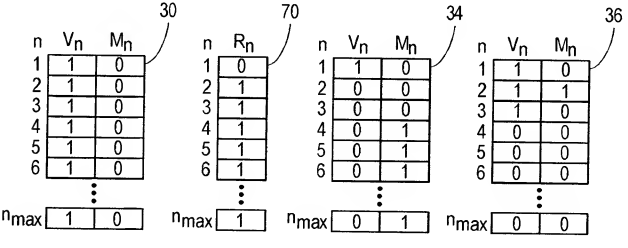

FIG. 3E

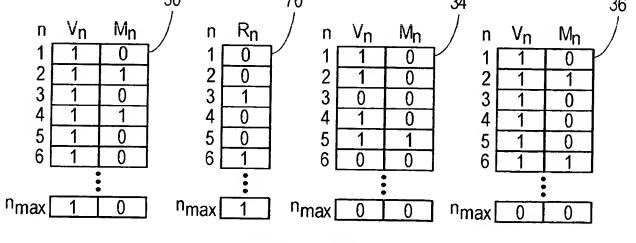

FIG. 3F

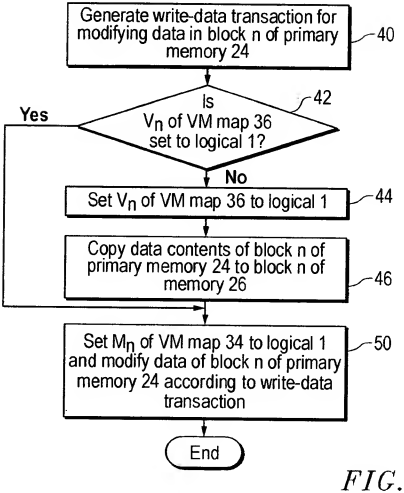
Generate write-data transaction for modifying data in block n of primary memory 24
40
Is V_n of VM map 36 set to logical 1?
42
Yes
No
Set V_n of VM map 36 to logical 1
44
Copy data contents of block n of primary memory 24 to block n of memory 26
46
Set M_n of VM map 34 to logical 1 and modify data of block n of primary memory 24 according to write-data transaction
50
End

FIG. 4

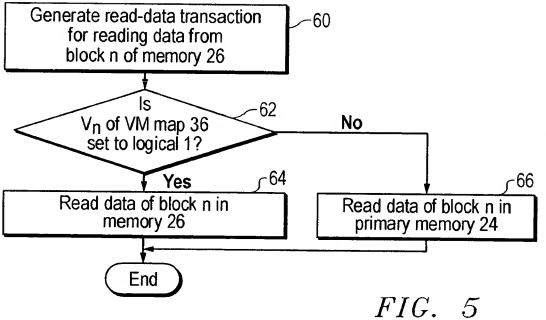
Generate read-data transaction for reading data from block n of memory 26
60
Is V_n of VM map 36 set to logical 1?
62
No
Yes
64
Read data of block n in memory 26
66
Read data of block n in primary memory 24
End

FIG. 5

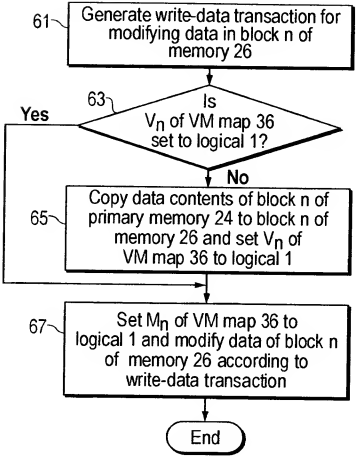
61
Generate write-data transaction for modifying data in block n of memory 26
63
Is V_n of VM map 36 set to logical 1?
Yes
No
65
Copy data contents of block n of primary memory 24 to block n of memory 26 and set V_n of VM map 36 to logical 1
67
Set M_n of VM map 36 to logical 1 and modify data of block n of memory 26 according to write-data transaction
End

FIG. 6

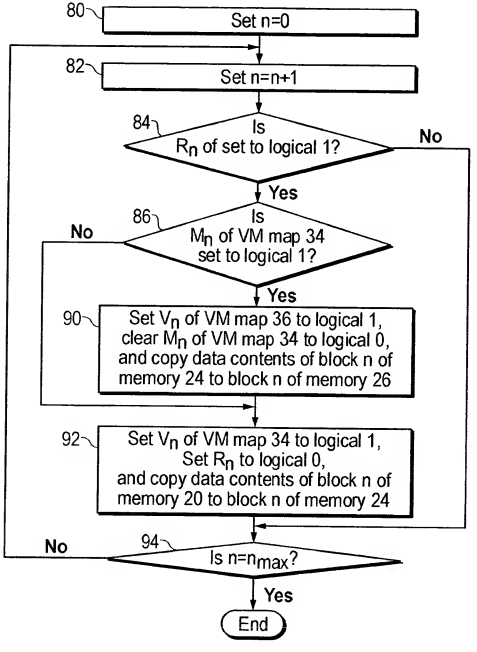
80
Set n=0
82
Set n=n+1
84
Is
R_n of set to logical 1?
No
Yes
86
Is
M_n of VM map 34
set to logical 1?
No
Yes
90
Set V_n of VM map 36 to logical 1,
clear M_n of VM map 34 to logical 0,
and copy data contents of block n of
memory 24 to block n of memory 26
92
Set V_n of VM map 34 to logical 1,
Set R_n to logical 0,
and copy data contents of block n of
memory 20 to block n of memory 24
94
No
Is $n=n_{max}$?
Yes
End

FIG. 7

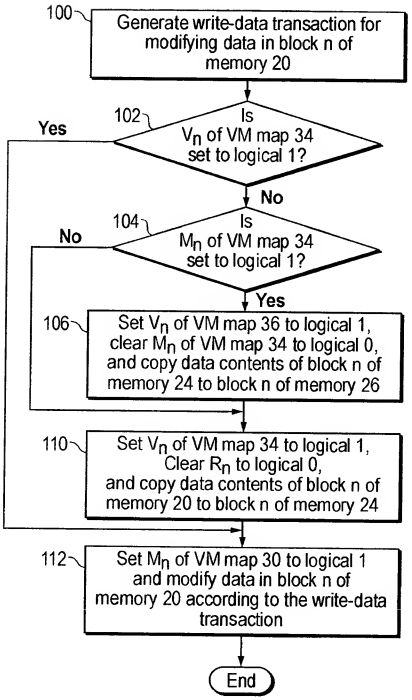
100
Generate write-data transaction for modifying data in block n of memory 20
102
Is V_n of VM map 34 set to logical 1?
Yes
No
104
Is M_n of VM map 34 set to logical 1?
No
Yes
106
Set V_n of VM map 36 to logical 1, clear M_n of VM map 34 to logical 0, and copy data contents of block n of memory 24 to block n of memory 26
110
Set V_n of VM map 34 to logical 1, Clear R_n to logical 0, and copy data contents of block n of memory 20 to block n of memory 24
112
Set M_n of VM map 30 to logical 1 and modify data in block n of memory 20 according to the write-data transaction
End

FIG. 8

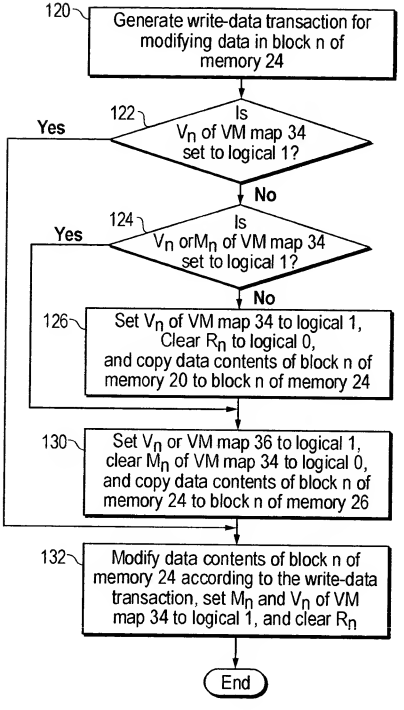
120
Generate write-data transaction for modifying data in block n of memory 24
122
Is V_n of VM map 34 set to logical 1?
Yes
No
124
Is V_n or M_n of VM map 34 set to logical 1?
Yes
No
126
Set V_n of VM map 34 to logical 1, Clear R_n to logical 0, and copy data contents of block n of memory 20 to block n of memory 24
130
Set V_n or VM map 36 to logical 1, clear M_n of VM map 34 to logical 0, and copy data contents of block n of memory 24 to block n of memory 26
132
Modify data contents of block n of memory 24 according to the write-data transaction, set M_n and V_n of VM map 34 to logical 1, and clear R_n
End

FIG. 9

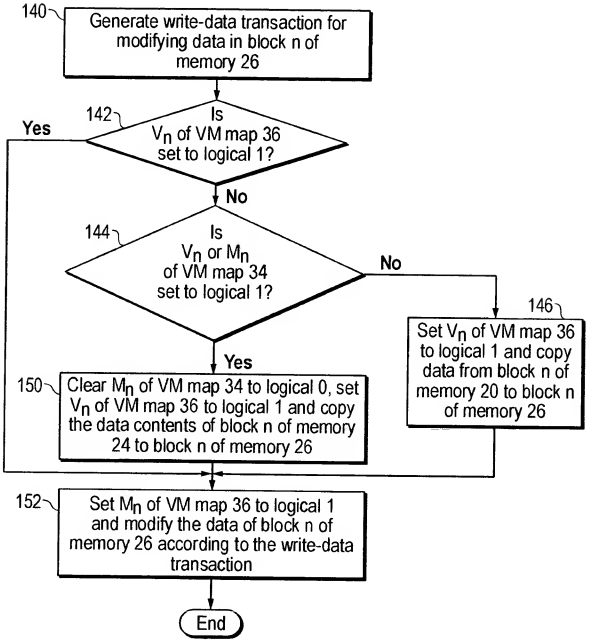
140
Generate write-data transaction for modifying data in block n of memory 26
142
Is V_n of VM map 36 set to logical 1?
Yes
No
144
Is V_n or M_n of VM map 34 set to logical 1?
No
Yes
146
Set V_n of VM map 36 to logical 1 and copy data from block n of memory 20 to block n of memory 26
150
Clear M_n of VM map 34 to logical 0, set V_n of VM map 36 to logical 1 and copy the data contents of block n of memory 24 to block n of memory 26
152
Set M_n of VM map 36 to logical 1 and modify the data of block n of memory 26 according to the write-data transaction
End

FIG. 10